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[57] **ABSTRACT**

A system and method for positioning voids in a medium. A chamber contains the medium, such as a solidifying liquid material, while a source of bubbles disposed at one side of the chamber introduces the bubbles into the chamber. Two or more acoustic wave transmitting devices disposed at respective ones of the sides of the chamber generate and transmit acoustic energy waves at respective frequencies which interact and cooperate to produce a standing wave field in an acoustically active region within the chamber. The standing wave field manipulates the bubbles into a matrix of bubbles having a predetermined spacing. By reducing the temperature of the chamber during the positioning and sizing of the bubbles in a desired pattern within the medium, the medium will be solidified so as to form a solid article with imbedded ordered voids. After solidifying the medium, by increasing the temperature of the sides of the chamber so as to melt the boundary of the solid article, the article will be separated from the chamber.

11 Claims, 6 Drawing Sheets

The diagram illustrates a microwave oven system. At the bottom, a **SIGNAL GENERATOR** (33) provides input to an **AMPLIFIER** (35). The output of the amplifier is connected to a magnetron assembly (12) located at the top of a shielded enclosure (16). The magnetron assembly consists of a cathode (28), an anode (27), and a waveguide (29). A dashed box (39) indicates a grid of elements (41) between the cathode and anode. A signal path (45) is shown leading from the magnetron towards the right side of the enclosure. On the right side, there is a component (24) with an antenna-like symbol, possibly a sensor or communication module. The entire system is enclosed in a shielded housing (16) with various internal components labeled with numbers.